



Progress Report

May 2019

Installation, Operation, and Maintenance of ERH at Third Site

985 South US Highway 421
Zionsville, Indiana

Summary

This progress report has been prepared by McMillan-McGee Corporation (Mc²) on behalf of the Third Site Trust (TST), pursuant to the Administrative Order by Consent (the order) for Third Site, located in Zionsville, Indiana (the Site). The revised Order approving Electrical Resistive Heating (ERH) groundwater remediation became effective on December 16, 2016. The Electro-Thermal Dynamic Stripping Process (ET-DSP™) is Mc²'s patented thermal remediation technology employed for this project. This monthly progress report includes activities conducted during the month of May 2019.

1. Activities Completed During Reporting Month

ET-DSP™ heating, extraction and treatment operations continued in May after restarting on April 22 based on groundwater sampling results from March 29. Refer to the April 2019 progress report for analysis of groundwater sampling results and description of the operations strategy to address the contaminant exceedances. Multi-phase extraction from the wellfield continued in the vicinity of monitoring wells MW-27R, P-1, and P-2. ET-DSP™ electrodes adjacent to P-1 and P-2 were energized to perform focused heating around those monitoring wells.

Mc² was onsite to operate the remediation system from Monday to Friday for most of May, and available to respond to alarms during off hours. IWM Consulting Group (IWM) operators were available to provide onsite support as needed. Onsite shifts were reduced to three days a week after May 29.

After electrode wells E-B4, E-C4, E-C5, E-D2, E-D3 and E-E2 were energized, OptiTAM® sensors at adjacent wells rapidly achieved steam temperatures. P-1 achieved 100°C through the middle and deep electrode depth ranges on May 1 and May 11, respectively. Similarly, P-2 achieved 100°C at the middle and deep depths on April 27 and May 11, respectively. The T-B2 sensor well adjacent to P-2 showed a similar temperature response. Temperature graphs of these three OptiTAM® sensor well locations since April are plotted in the attached Figure 1 through Figure 3.

Active middle and deep electrodes were decreased in power as temperature sensor points exceeded 100°C. On May 17, middle electrodes next to P-1 were shut off. As of May 23, all deep electrodes were shut off. These electrodes will be restarted as needed to maintain steam temperatures at the monitoring wells. Middle electrodes around P-2 remain on at reduced power level to maintain 100°C. The shallow electrodes remain operating at 12 kW to continue heating the upper treatment depths.

The area around MW-27R was allowed to cool with vapor and liquid extraction occurring from the adjacent X-B5 to facilitate attenuation of the acetone exceedance (refer to the April progress report). The cooling trend of the adjacent temperature sensor well T-B3 is shown in Figure 4. T-B3 remains above 40°C at the treatment depths and the temperatures are likely still limiting bacterial degradation of the acetone.

Monitoring of the vapor and liquid treatment streams indicates approximately 50 lbs of total VOC mass recovered since the system was restarted on April 22. Between the May 1 and May 15 treatment system sampling events, the total VOC concentration decreased from 4,300 µg/L to 3,220 µg/L at the liquid inlet, and from 75 ppm to 25 ppm at the vapor inlet. PID

readings on the vapor inlet peaked at 16 ppm on May 16 and decreased below 4 ppm on May 22. PID readings from the extraction wells were also low; the highest measurement on May 21 was 13 ppm at X-D2. Based on these observations, Mc² obtained groundwater screening samples from the five monitoring wells, MW-27R, P-1, P-2, P-3, and SUMP on May 23. The sampling was not performed to a confirmatory standard, and is only intended to indicate progress of treatment.

Groundwater screening results were available on May 29, as follows:

- P-2 VOC concentration was reduced to within the treatment target with a total of 2,092 ug/L of analyzed constituents. Soil temperatures will be maintained and extraction will continue near this well.
- P-3 and Sump remained within treatment target, with total VOC concentrations of 65 and 1,102 ug/L, respectively.
- P-1 remained in exceedance due to TCE and 1,2-Dichlorobenzene, but total VOCs decreased by about 50% from the March 29 results, from 47,679 to 20,340 ug/L. Heating and extraction will continue near this well.
- MW-27R remained in exceedance due to acetone at 1,350 ug/L. The temperature remains above 40°C at T-B3. Additional extraction wells (X-A4, X-B6, X-C5) were brought online to enhance both cooling of the area and recovery of acetone.

The following activities occurred during the reporting period:

- On May 1, Mc² and IWM obtained liquid and vapor samples from the treatment system.
- On May 2, Mc² completed system adjustments for focused remediation around monitoring wells P-1, P-2, and MW-27R as described in the April progress report. After the system was restarted on April 22, Mc² performed various electrode reconfigurations, voltage tap changes, and extraction system adjustments to optimize treatment.
- On May 3 additional slurper air lift tubes at X-A3, X-B3, X-C3, X-C2, X-C1, X-D1, and X-E2 were turned on to provide additional injection water for active electrodes while ensuring hydraulic containment. Slurper tube duty cycles were increased from 50% to 67% at the control panel on May 7 to further increase the overall liquid extraction rate.
- On May 10, a steam regeneration cycle was performed on the vapor carbon vessels due to increasing PID readings at the effluent since May 7.
- Voltage tap changes were performed on the power delivery system (PDS) on May 10, 15 and 17 to improve heating at the active shallow electrodes, and decrease power at the active middle and deep electrodes where steam temperatures had been achieved.
- On May 15, Mc² and IWM obtained liquid and vapor samples from the treatment system; and obtained vacuum, temperature and PID readings from the active extraction wells.
- On May 21, Mc² obtained PID readings from the active extraction wells and monitoring wells.

- On May 23, Mc² obtained groundwater screening samples from the five monitoring wells. The electrodes were shut off during this work. As the monitoring wells in the DNAPL Area remained at steam temperature, these wells were sampled with bailers.
- On May 29, additional extraction wells X-A4, X-B6, and X-C5 near monitoring well MW-27R were brought online based on groundwater sampling results.

2. Data Generated During Reporting Month

- Mc² resumed generating data per the project requirements defined in the Sampling and Analysis Plan after treatment operations restarted on April 23. The data requirements for thermal remediation operations are summarized in Table 1.
- Mc² obtained biweekly vapor and liquid samples from the treatment system for analysis by Pace Laboratories on May 1 and May 15. Vapor and liquid discharge concentrations remained within regulatory limits.
- Mc² obtained groundwater screening samples from the five monitoring wells on May 23. Laboratory results were received on May 29. Refer to §1.

3. Developments/Difficulties Encountered During the Reporting Month

- Liquid tank level controls for the treatment system were not operating reliably in May. Various maintenance tasks were required and off-hours "yellow" alarm responses were required on several occasions.
- Groundwater screening results from May 23 showed reductions in contaminant concentrations as described above. Focused treatment around monitoring wells P-1 and MW-27R will continue. Refer to §1.

4. Activities Anticipated for Next Reporting Month

- ET-DSP™ heating and multi-phase extraction (MPE) operations will continue in the vicinity of monitoring wells P-1 and P-2, with Mc² performing onsite operations. Mc² will operate the electrodes as needed to maintain subsurface steam temperatures and mobilize contaminants for recovery. The above ground treatment system will continue treating the recovered contaminants. MPE operations will continue from four extraction wells in the vicinity of MW-27R.
- Mc² will perform biweekly groundwater screening of the monitoring wells.
- Waste DNAPL drums will be transported offsite for disposal by Safety-Kleen. The waste profile has been approved by TST.
- Mc² will complete the interim report for project operations through February 2019. The report will be reviewed by TST prior to submission to USEPA.

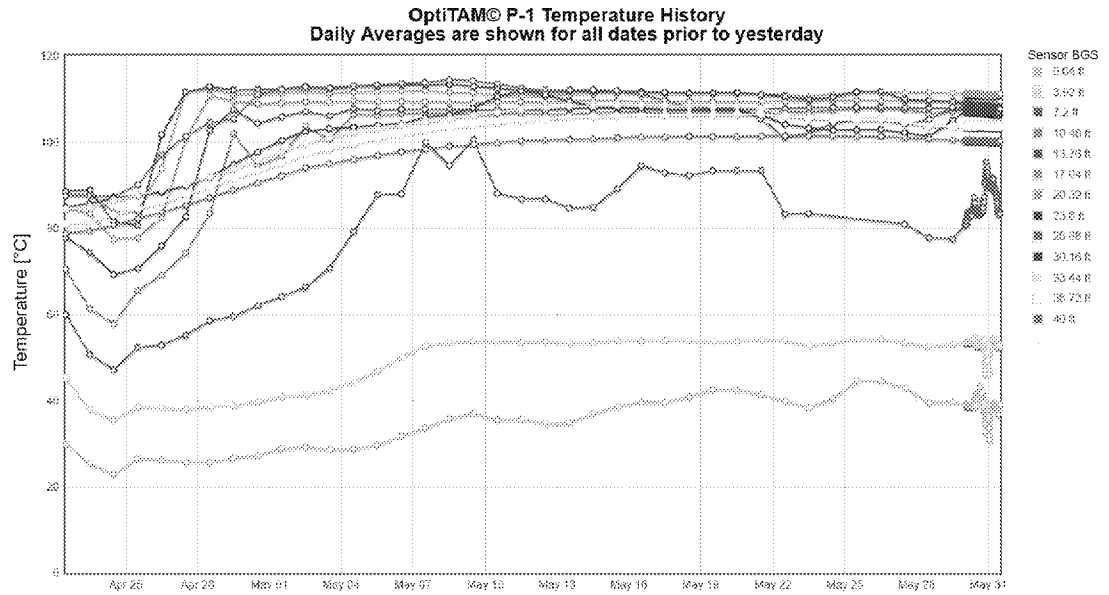


Figure 1: P-1 Monitoring Well Temperature Response

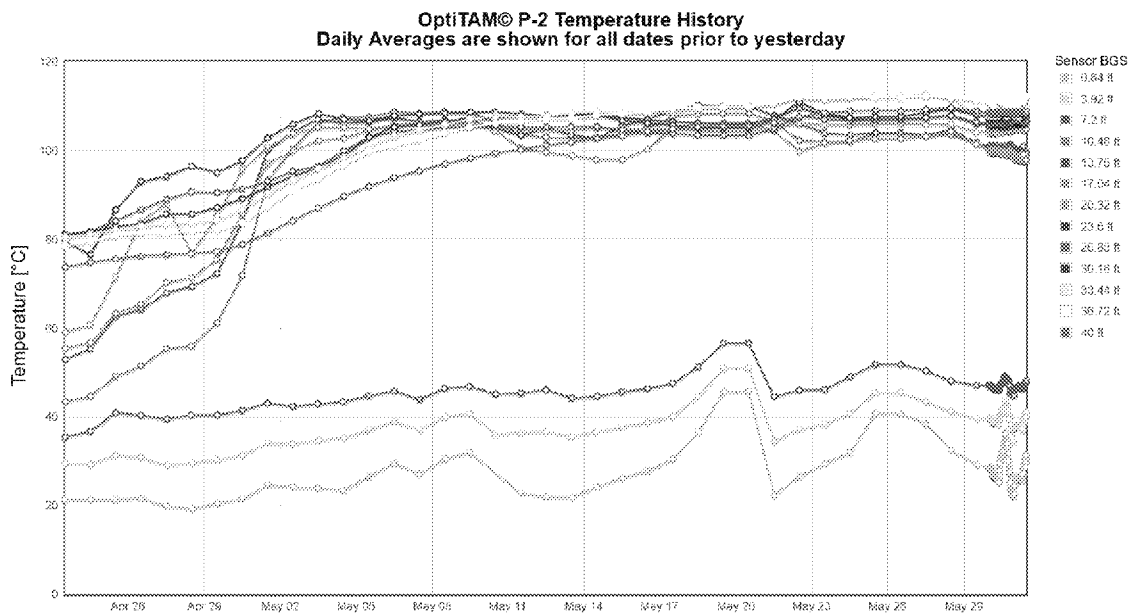


Figure 2: P-2 Monitoring Well Temperature Response

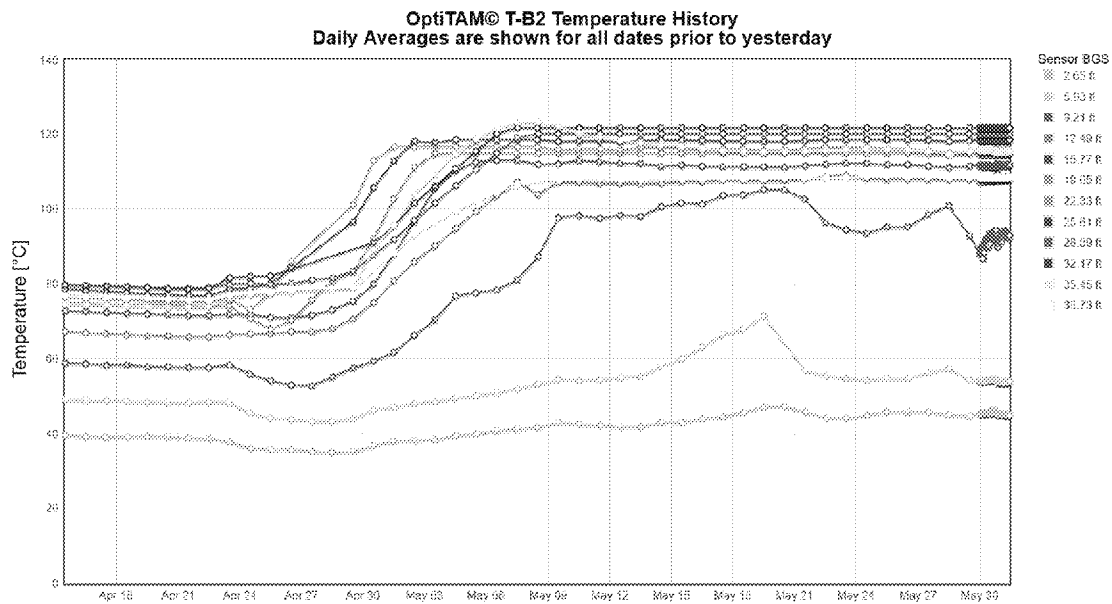


Figure 3: T-B2 Sensor Well Temperature Response

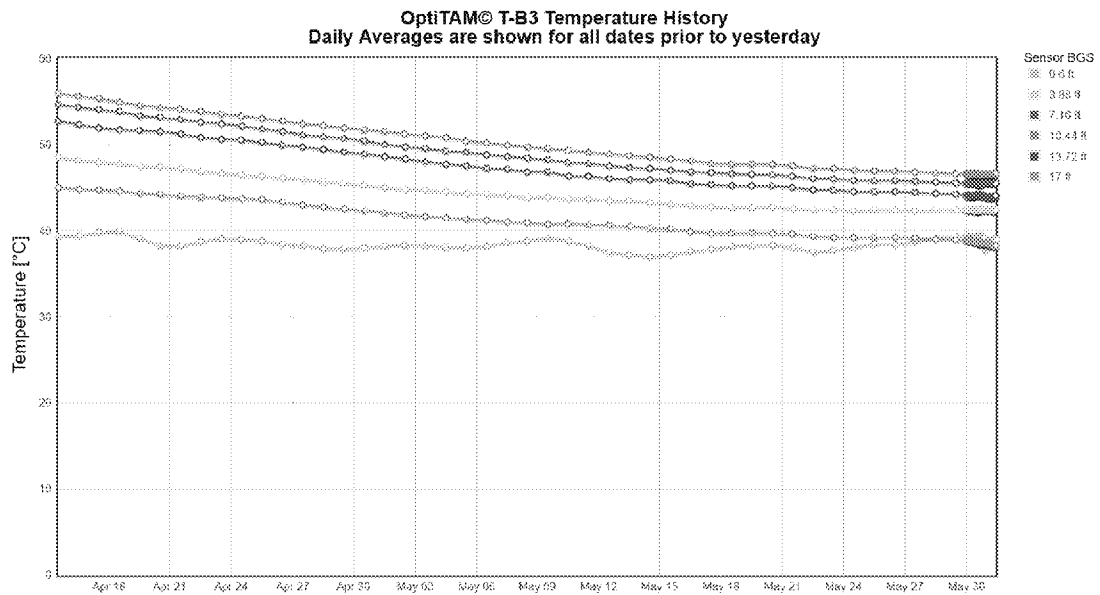


Figure 4: T-B3 Sensor Well Temperature Response

Item	Media	Location	Method	Frequency
Power, current, voltage	Subsurface	Electrodes	PDS (automatic)	Minutely (averaged daily)
Temperature	Subsurface	Sensor wells	OptiTAM© (automatic)	Hourly (averaged daily)
Temperature	Extracted fluids	Extraction wells, treatment system	Temperature gauge or gun (manual)	Daily
Vacuum	Vapor extracted	Vacuum Monitoring/ Extraction wells	Vacuum gauge (manual)	Daily
Level	Groundwater	Extraction and monitoring wells	Water Level Interface Probe	Weekly
Flow Rate	Vapor extracted	Treatment influent	Averaging pitot tube (manual)	Daily
Flow Rate	Vapor discharged	Treatment effluent	Averaging pitot tube (manual)	Daily
Flow Rate	Vapor extracted	Extraction wells	Averaging pitot tube (manual)	Biweekly
Volume	Water extracted	Treatment influent	Flow totalizer (manual)	Daily
Volume	Water discharged	Treatment effluent	Flow totalizer (manual)	Daily
Volume	Water injected	Treatment reinjection	Flow totalizer (manual)	Daily
Volume	Water injected	Electrodes	WCS (automatic)	Hourly (averaged daily)
Vapor VOCs	Vapor extracted	Extraction wells	PID (manual)	Biweekly
Vapor VOCs	Vapors treated	Treatment system	PID (manual)	Daily
Vapor VOCs	Vapor discharged	Treatment effluent	PID (manual)	Daily
Vapor VOCs ¹ (Analytical)	Vapors treated	Selected treatment system sample ports	USEPA TO-15 modified (Tedlar bag) (manual)	Biweekly
Liquid VOCs ¹ (Analytical)	Liquids treated	Selected treatment system sample ports	USEPA 8260B Pump or valve (manual)	Biweekly

Table 1: Monitoring Parameters for Third Site ERH